



(11)

EP 2 323 011 A3

(12)

EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
09.09.2015 Bulletin 2015/37

(51) Int Cl.:
G06F 1/26 (2006.01)

(43) Date of publication A2:
18.05.2011 Bulletin 2011/20

(21) Application number: 10184601.2

(22) Date of filing: 23.12.2003

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PT RO SE SI SK TR

(30) Priority: 30.12.2002 US 334966

(62) Document number(s) of the earlier application(s) in accordance with Art. 76 EPC:
03258191.0 / 1 443 384

(71) Applicant: Intel Corporation
Santa Clara, CA 95054 (US)

(72) Inventors:

- Gunther, Stephen H.
Beaverton, OR 97007 (US)
- Ma, Matthew M.
Portland, OR 97229 (US)
- Dai, Kevin
San Jose, CA 95131 (US)
- Greiner, Robert
Beaverton, OR 97006 (US)

(74) Representative: Clarke, Jeffrey David
HGF Limited
140 London Wall
London EC2Y 5DN (GB)

(54) Dynamic voltage transitions

(57) The operating voltage of an integrated circuit (e.g., a processor) is changed in response to one or more conditions (e.g., a laptop computer is connected to an AC power source). Both the operating frequency and the operating voltage of the integrated circuit are changed. The voltage regulator providing the operating voltage to

the integrated circuit is caused to transition between voltage levels using one or more intermediate steps. The integrated circuit continues to operate in the normal manner both at the new voltage and throughout the voltage transition.

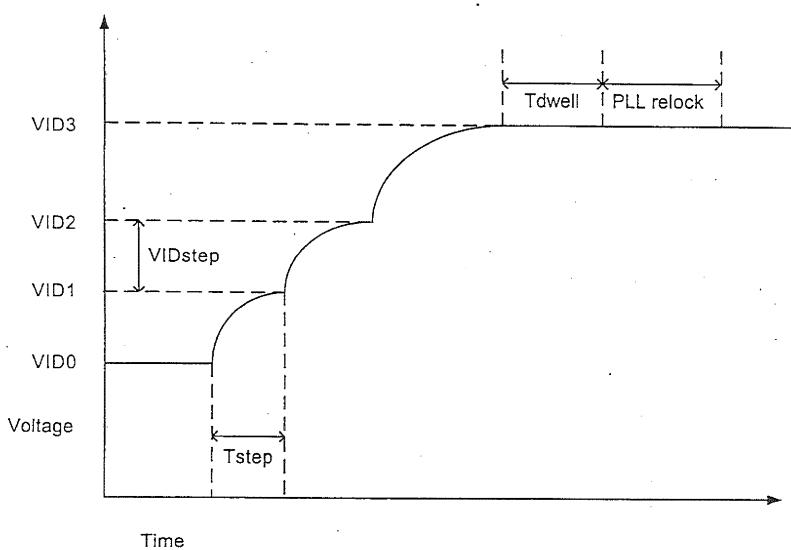


Fig. 3



EUROPEAN SEARCH REPORT

Application Number

EP 10 18 4601

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (IPC)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	US 2002/104029 A1 (FANG WEN-CHI [TW]) 1 August 2002 (2002-08-01) * paragraph [0006] - paragraph [0039]; figures 1-4 *	1-15	INV. G06F1/26
X	US 2002/087896 A1 (CLINE LESLIE E [US] ET AL) 4 July 2002 (2002-07-04) * paragraph [0011] - paragraph [0023]; figures 1-3 *	1-15	
X	WO 02/17064 A2 (KONINKL PHILIPS ELECTRONICS NV [NL]) 28 February 2002 (2002-02-28) * page 3, line 15 - page 16, line 33; figures 1-5 *	1-15	
A	WO 02/29535 A2 (INTEL CORP [US]; DAI XIA [US]) 11 April 2002 (2002-04-11) * the whole document *	1-15	
A	US 2002/109489 A1 (SHAVER CHARLES N [US] ET AL) 15 August 2002 (2002-08-15) * the whole document *	1-15	TECHNICAL FIELDS SEARCHED (IPC)
A	US 5 692 201 A (YATO HIDENORI [JP]) 25 November 1997 (1997-11-25) * the whole document *	1-15	G06F
A	JP 2000 259288 A (TOSHIBA CORP) 22 September 2000 (2000-09-22) * the whole document *	1-15	
The present search report has been drawn up for all claims			
1	Place of search	Date of completion of the search	Examiner
	Munich	29 July 2015	Vertua, Arturo
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			
T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

EP 10 18 4601

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

29-07-2015

10

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
US 2002104029	A1	01-08-2002	TW US	535050 B 2002104029 A1	01-06-2003 01-08-2002	
US 2002087896	A1	04-07-2002	NONE			
WO 0217064	A2	28-02-2002	AT CN EP JP US WO	528708 T 1478224 A 1368729 A2 2004507814 A 6766460 B1 0217064 A2	15-10-2011 25-02-2004 10-12-2003 11-03-2004 20-07-2004 28-02-2002	
WO 0229535	A2	11-04-2002	AT AU DE EP KR TW US US WO	315803 T 9314101 A 60116650 T2 1325402 A2 20030041142 A 539939 B 6941480 B1 2002083356 A1 0229535 A2	15-02-2006 15-04-2002 27-07-2006 09-07-2003 23-05-2003 01-07-2003 06-09-2005 27-06-2002 11-04-2002	
US 2002109489	A1	15-08-2002	NONE			
US 5692201	A	25-11-1997	JP JP US	3385811 B2 H0887364 A 5692201 A	10-03-2003 02-04-1996 25-11-1997	
JP 2000259288	A	22-09-2000	NONE			

EPO FORM P0459

55

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82